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Dialysis Dose and Removal Efficiency of Post-Dilution Online HDF at a Reduced Dialysate Flow Rate

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Objectives : The impact of hemodialysis on the environment has been widely discussed in recent years, and the possibility of reducing resource usage has been explored. The purpose of the present study was to investigate whether reducing the dialysate flow rate might affect the dialysis dose (spKt/V for urea) and removal efficiency.
Methods : The study included 6 chronic hemodialysis patients from our clinic. Patients undergoing post-dilution online HDF under current treatment conditions were used as the control group. The ratio of the dialysate flow (Qd) to blood flow (Qb), namely, the Qd/Qb, decreased from 1.7 (control) to 1.4 or 1.2. The spKt/V for urea, as well as the reduction rates and removal amounts of urea, β2-microglobulin (BMG), and α1-microglobulin (AMG) were compared. When the Qd was varied, all the other treatment conditions, such as the Qb (with a mean of 280 mL/min), were maintained except for the amount of water removal, which should be adjusted in each treatment.
Results : There was no significant difference in the spKt/V for urea between the control group (1.56±0.20) and the groups in which a Qd/Qb of 1.4 (1.57±0.21) or 1.2 (1.52±0.20) was used. The urea reduction rates were 73.3±4.8%, 73.2±5.4%, and 72.1±5.2%, and the BMG reduction rates were 75.6±4.5%, 75.3±5.6%, and 75.5±5.6%, respectively; the reduction rates of AMG were 17.5±10.6%, 18.5±10.3%, and 17.8±9.7%, respectively. The results revealed no significant differences in the reduction rates or removal amounts of the aforementioned molecules. These results indicate that by maintaining a high Qb and convection volume in each treatment allows maintenance of the removal efficiency even at reduced dialysate flow rates.
Conclusions : Under the treatment conditions in the present study, dialysis dose and removal efficiency were maintained even when the Qd/Qb was reduced to 1.2.